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मानक

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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 418 (2004): Tungsten Filament Lamp for Domestic and Similar General Lighting Purposes [ETD 23: Electric Lamps and their Auxiliaries]



“ज्ञान से एक नये भारत का निर्माण”

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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
घरेलू और ऐसे ही सामान्य प्रकाश प्रयोजनों के लिए टंगस्टन
फिलामेंट लैम्प
(चौथा पुनरीक्षण)

Indian Standard
TUNGSTEN FILAMENT LAMPS FOR DOMESTIC AND
SIMILAR GENERAL LIGHTING PURPOSES
(*Fourth Revision*)

First Reprint FEBRUARY 2006
(Including Amendment No 1)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

AMENDMENT NO. 1 JANUARY 2006 TO IS 418:2004 TUNGSTEN FILAMENT LAMPS FOR DOMESTIC AND SIMILAR GENERAL LIGHTING PURPOSES

(*Fourth Revision*)

(*General*) — Substitute IS 15518 (Part 1) 2004 for Doc ET 23 (5291) wherever it appears

(*Page 1 clause 1.1 para 2 first line*) Substitute mm' for mm'

(*Page 1 clause 1.1 Notes*) — Add the following note after NOTE 2

3 Lamp data sheets for equivalently coated finishes or while finishes are under consideration

(*Page 1 clause 2.1*) — Insert the following at the appropriate place

IS	No	Title
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1112 (Part 1) 1989	Glass shells for general lighting service lamps Part 1	– 60 to 80 mm shell diameter (<i>second revision</i>)
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12897 2001	Filaments for general service lamps — Guide (<i>first revision</i>)'	
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(*Page 2, clause 5.3*) — Insert the following Note after 5.3

NOTE — The life test may be carried out as per the alternative method given in Annex J
This alternative method shall be valid up to 31 December 2000

(*Page 2 clause 5.3*) — Insert the following after 5.3

'5.4 For guidance, see IS 1112 (Part 1) 1989 for Glass shells and IS 12897 2001 for Tungsten filaments

(*Page 4, clause 11.2.4. informal table*) - Insert the following Note after the table

'NOTE The sample size for I TQ shall be 20 and qualifying limit for average life and life are 960 hours and 4 hours respectively when tested as per Annex J

(*Page 8, clause A-4.4.1 line 3*) — Substitute Table J-I of IS 15518 (Part 1) 2004' for 'Table K-I of Doc ET 23 (5291)'

Price Gr 2

Amend No. 1 to IS 418 : 2004

(*Page 8 clause A-4.5. Note*) Add the following at the end

'When testing is done at voltages in excess of the rated voltage, the lamps shall first be switched on at the rated voltage and then raised immediately to test voltage within 5???

(*Page 15, Annex F, informal table, col 1, row 4*) — Substitute 'V' for 'B'

(*Page 16, Annex G, col 3, rows 1 to 9 and 14 to 22*) – Add 'A55' before 'A60'

(*Page 17, Annex H*) — Add the following Annex after Annex H

ANNEX J

(*Clauses 5.4 and 11.2.4*)

LIFE TEST PROCEDURE

J-1 CONDITION OF TESTING

J-1.1 Position of Burning

Lamp shall burn in a vertical position with cap up. The lamp holders axis on the test-racks shall not deviate from the vertical by more than 5°

Lamps shall burn free from noticeable vibrations. No vibrations or shocks should be perceptible when touching the lamp holders, either during burning or when switching 'on' or 'off'.

J-1.2 Lamp Holders

Lamp holders on life-test racks shall be of sturdy construction and shall be designed to ensure adequate electrical contact and to prevent overheating

The voltage drop between the point of measurement on the supply line and the holder contacts shall not exceed 0.1 percent of the test voltage

For bayonet lamp holders, the cap shall be substantially at the same potential as the contact which is not connected to the main supply lead equipped with a fuse

NOTES

- 1 It is recommended that lamp holders of the spring loaded plunger type shall not be used for prolonged testing

Amend No. 1 to IS 418 : 2004

The torque imposed on insertion or extraction of the lamp shall not exceed 4 Nm for 1.27 and B22 caps.

The cap temperature in operation shall not exceed 210°C.

2 Lamps shall not be operated at excessive ambient temperature, neither shall there be undue heating of a lamp by others.

J-1.3 Ageing

The initial readings shall be taken after an ageing period of approximately one hour at rated voltage.

J-1.4 Photometry — Measurements shall be carried out as given in **A-3**.

J-1.5 Life Test Procedure

J-1.5.1 Test Voltage

The test voltage shall be a stable voltage (*see J-1.5.2*) between 100 percent and approximately 110 percent of the rated voltage.

The equivalent life for rated volts shall be determined in accordance with the following equation:

$$L_o = L \cdot \frac{U^n}{U_o^n}$$

where

L_o = life at rated voltage,

L = life at test voltage,

U_o = rated voltage,

U = average effective voltage during life test, and

n = 13 for vacuum lamps and 14 for gas-filled lamps.

The lamps shall be burnt on alternating current at a frequency of a nominal value between 40 Hz and 60 Hz.

NOTE In general, testing at voltages in excess of the rated voltage is practiced mainly for reasons of economy. When testing is done at voltages in excess of the rated voltage, the lamps shall first be switched on at the rated voltage and then raised immediately to test voltage within 5 s

Amend No. 1 to IS 418 : 2004

J-1.5.2 Voltage Control

The momentary fluctuation of the test voltage during the life test shall not exceed ± 1 percent and the mean effective value of the test voltage during the life test shall be taken for the calculations given in **J-1.5.1** The voltage shall be free from perceptible flicker

NOTES

- 1** Mean effective value of the voltage may be obtained by a suitable I^2 meter described as below
 - a) The I^2 meters are based on the same principle as the normal single phase induction kilowatt-hour meters. The difference is that a fine-wired coil in series with a high resistance has been substituted for the normal current coil. This coil as well as the normal voltage coil are both connected in parallel to the mains
 - b) As the speed of the rotation of the disc is proportional to the voltage on the voltage coil and the current in the current coil and as the latter is proportional to the voltage with the built-in resistance constant, the speed of rotation of the disc is proportional to the square of the voltage Hence the reading per unit of time is proportional to the square of the voltage
 - c) The measurement of the time is done by a clock work starting and stopping with voltage on and off If the clock-work is of the synchronous type it should be ensured that the frequency is correct It is of the electrically worked self-starting type with a balance it should be compared with a normal good watch adjusted in the normal way
 - d) The accuracy of the I^2 meter depends on the steadiness of the voltage used The accuracy is generally about 0.25 percent when the voltage used is within ± 1 percent In this respect the I^2 meter is more accurate than any recording voltmeter the accuracy of which is mostly not greater than 2 percent of the full-scale value
- 2** As an alternative to I^2 meter mean effective voltage can also be measured by other suitable methods utilizing stabilized power supply and means to measure and record the voltage at a regular interval throughout the life testing, the period of such readings not exceeding 30 min The variation in the power supply under steady state conditions shall be within ± 0.5 percent and the meters used during testing shall be of accuracy of class 0.5 or better

J-1.5.3 Switching On' and 'Off'

Lamps shall be switched off twice daily for periods of not less than 15 min. such periods not being considered as part of the burning hours of the lamp

J-1.5.4 Measurements

Lamps subjected to the life test shall be measured for lumens at the rated voltage. at 750 ± 25 h or its equivalent if forced testing is used

Amend No. 1 to IS 418 : 2004

J-1.5.5 *Termination of Test*

The life test shall be considered to have terminated at 1 250 hours, or its equivalent if forced testing is used.'

(*Pages 20 to 28 and 33 to 41, first line of data sheets*) — Add 'A55 Bulb Designation'

(ET 23)

AMENDMENT NO. 2 JUNE 2007
TO
IS 418 : 2004 TUNGSTEN FILAMENT LAMPS FOR DOMESTIC AND
SIMILAR GENERAL LIGHTING PURPOSES
(Fourth Revision)

(Second cover, Foreword, para 5, last sentence) — Insert the following at the end:

"For the sake of convenience, the data sheet numbers as given in IEC 60064 have been followed except for 75 W ratings which are presently not covered in IEC Standard."

(Page 16, Annex G, row 7) — Insert the following new entries after row 7:

Sheet No.	Watts	Bulb	Cap	Finish ¹⁾	Life, h	Luminous Flux ²⁾
418-IS-6000	75	A55, A60, K60, M60 and PS 60	B22d/25×26	C, F	1 000	N
418-IS-6001	75	A50, A60, K60, M60 and PS 60	B22d/25×26	C, F	1 000	H

(Page 16, Annex G, row 20) — Insert the following new entries after row 20:

Sheet No.	Watts	Bulb	Cap	Finish ¹⁾	Life, h	Luminous Flux ²⁾
418-IS-6002	75	A55, A60, K60, M60 and PS 60	E27/27	C, F	1 000	N
418-IS-6003	75	A55, A60, K60, M60 and PS 60	E27/27	C, F	1 000	H

Amend No. 2 to IS 418 : 2004

(Page 26, Data Sheet 418-IS-4055-1) – Insert the following new 4 data sheets after this:

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**

B22

75 W

1 000 h

Dimensions in millimeters.

Bulb designation: A55, A60, K60, M60 and PS60

Bulb finish: Frosted or Clear

Cap: B22d/25 × 26

Rated wattage (W): 75

Dimensions: as defined in **13**

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	1m
110	1 010
230	840
240	830
250	820

Information for luminaire design:

Maximum outline: under consideration

418-IS-6000-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
B22 75 W 1 000h
Dimensions in millimetres.

Bulb designation: A55, A60, K60, M60 and PS60

Bulb finish: Frosted or Clear

Cap: B22d/25 × 26

Rated wattage (W): 75

Dimensions: as defined in **13**

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	1m
110	1 090
230	940
240	930
250	920

Information for luminaire design:

Maximum outline: under consideration

418-IS-6001-1

Amend No. 2 to IS 418 : 2004

(Page 39, Data Sheet 418-IS-4055-1) — Insert the following new data sheets after this:

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 75 W 1 000 h

Dimensions in millimeters.

Bulb designation: A55, A60, K60, M60 and PS60

Bulb finish: Frosted or Clear

Cap: E27/27

Rated wattage (W): 75

Dimensions: as defined in 13

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1 000

For reference in the requirements of 10

Lumen maintenance (%): 85

Conditions of 9 apply

Minimum rated luminous flux:

Conditions of 8 apply

V	lm
110	1 010
230	840
240	830
250	820

Information for luminaire design:

Maximum outline: under consideration

418-IS-6002-1

**GH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 75 W 1 000 h

Dimensions in millimeters.

Bulb designation: A55, A60, K60, M60 and PS60

Bulb finish: Frosted or Clear

Cap: E27/27

Rated wattage (W): 75

Dimensions: as defined in 13

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1 000

For reference in the requirements of 10

Lumen maintenance (%): 85

Conditions of 9 apply

Minimum rated luminous flux:

Conditions of 8 apply

V	lm
110	1 090
230	940
240	930
250	920

Information for luminaire design:

Maximum outline: under consideration

418-IS-6003-1

AMENDMENT NO. 4 NOVEMBER 2012
TO
IS 418 : 2004 TUNGSTEN FILAMENT LAMPS FOR
DOMESTIC AND SIMILAR GENERAL LIGHTING PURPOSE

(Fourth Revision)

(Page 1, clause 1.1, lines 5 and 6) — Substitute the following for the existing:

‘—rated wattage of 15 W, 25 W, 40 W, 60 W, 75 W and 100 W’.

(Page 1, clause 1.1, lines 15 and 16) — Substitute the following for the existing:

‘The shell diameter of lamps shall be between 54 to 56 mm or 59 to 62 mm.

NOTE — Shell diameter of 59 to 62 mm shall be phased out after one year from the date of issue of this amendment.’

[Page 1, Clause 2.1 (see also Amendment No. 1)] — Insert the following reference at the appropriate place:

‘2407 : 1963 Photometric Integrators’

[Page 2, Clause 5.4 (see also Amendment No. 1)] — Substitute the following for the existing clause:

‘5.4 For the guidance to the lamp manufacturers, the requirements for glass shells are given in IS 1112 (Part 1) and IS 12897 for lamp filament.’

(Page 8, clause A-3, first sentence) — Substitute the following for the existing sentence:

‘Measurement shall be carried out utilizing a suitable photometric integrator as specified in IS 2403.’

(Page 16, Annex G, Table G) — Number the existing table as Table G-1 and add new Table G-2 as follows:

(Page 16, Annex G, Informal Table) — Insert the following NOTE at the end:

NOTE — The Table G-1 shall be withdrawn after one year from the date of issue of this amendment.

Table G-2
(Clause 1.1, 4.1 and 4.3)

GROUPING OF LAMP DATA SHEETS

Sheet No.	Watt	Bulb	Cap	Finish ¹⁾	Life h	Luminous Flux ²⁾
418-IS-4005	15	A55, K55, M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	N
418-IS-4010	25	A55, K55, M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	H
418-IS-4015	25	A55, K55, M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	N
418-IS-4030	40	A55, K55, M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	H

Price Group 2

Amendment No. 4 to IS 418 : 2004

Sheet No.	Watts	Bulb	Cap	Finish ¹⁾	Life, h	Luminous Flux ²⁾
418-IS-4035	40	A55, K55,M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	N
418-IS-4050	60	A55, K55,M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	H
418-IS-4055	60	A55, K55,M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	N
418-IS-4070	100	A55, K55,M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	H
418-IS-4075	100	A55, K55,M55 and PS55	B22d/25x26 and B-22/23 X 26	C, F	1 000	N
418-IS-5005	15	A55, K55,M55 and PS55	E 27/27	C, F	1 000	N
418-IS-5010	25	A55, K55,M55 and PS55	E 27/27	C, F	1 000	H
418-IS-5015	25	A55, K55,M55 and PS55	E 27/27	C, F	1 000	N
418-IS-5030	40	A55, K55,M55 and PS55	E 27/27	C, F	1 000	H
418-IS-5035	40	A55, K55,M55 and PS55	E 27/27	C, F	1 000	N
418-IS-5050	60	A55, K55,M55 and PS55	E 27/27	C, F	1 000	H
418-IS-5055	60	A55, K55,M55 and PS55	E 27/27	C, F	1 000	N
418-IS-5070	100	A55, K55,M55 and PS55	E 27/27	C, F	1 000	H
418-IS-5075	100	A55, K55,M55 and PS55	E 27/27	C, F	1 000	N
¹⁾ C = Clear, F =Frosted ²⁾ N = Normal luminous flux; H = High Luminous flux NOTE — Table G-2 shall be applicable after one year from publication of this amendment.						

(Pages 20 to 28, *Lamp Data Sheet* 418-IS-4005-1 to 418-IS-4075-1, first informal table, col 2, D, Max) — Substitute ‘55 and 62’ for ‘62’.

(Pages 20 to 28, *Lamp Data Sheet* 418-IS-4005-1 to 418-IS-4075-1, first informal table) — Insert the following note at the end:

‘NOTE — D, Max 62 shall be phased out after one year from the date of publication of this amendment.’

(Page 29, *Lamp Data Sheet*. 418-IS-4090-1) — Delete.

(Page 30, *Lamp Data Sheet*. 418-IS-4095-1) — Delete.

(Page 31, *Lamp Data Sheet* 418-IS-4110-1) — Delete.

(Page 32, *Lamp Data Sheet* 418-IS-4115-1) — Delete.

(Pages 33 to 41, *Lamp Data Sheet* 418-IS-5005-1 to 418-IS-5075-1 first informal table, col 2, D, Max) — Substitute ‘55 and 62’ for of ‘62’.

Amendment No. 4 to IS 418 : 2004

(Pages 33 to 41, *Lamp Data Sheet* 418-IS-5005 -1 to 418-IS-5075-1, first informal table) — Insert the following note at the end:

‘NOTE — *D*, *Max* 62 shall be phased out after one year from the date of publication of this amendment.’

(Page 42, *Lamp Data Sheet*. 418-IS-5090-1) — Delete.

(Page 43, *Lamp Data Sheet*. 418-IS-5095-1) — Delete.

(Page 44, *Lamp Data Sheet*. 418-IS-5110-1) — Delete.

(Page 45, *Lamp Data Sheet*. 418-IS-5115-1) — Delete.

Indian Standard

TUNGSTEN FILAMENT LAMPS FOR DOMESTIC AND SIMILAR GENERAL LIGHTING PURPOSES

(Fourth Revision)

1 SCOPE

1.1 This standard applies to tungsten filament incandescent lamps for general lighting service (GLS) which comply with the safety requirements in Doc ET 23 (5291) and having:

- rated wattage of 15 W, 25 W, 40 W, 60 W, 100 W, 150 W and 200 W;
- rated voltage 110 V, 230 V, 240 V and 250 V, including marked voltage range not exceeding ± 2.5 percent of the mean voltage (*see* Note 1).
- bulbs of the A, K, M or PS shapes (*see* IS 14897 for glass bulb designation);
- bulbs with clear, frosted or equivalently coated finishes, or white finishes.
- caps B22d or E27.

The shell diameter of lamps shall be from 54 to 62 mm for ratings up to 100 W.

Specific lamp types are covered in Annex G.

This standard states the performance requirements for lamps, including test methods and means of confirming compliance with the requirements. Whole production appraisal methods regarding a lamp manufacturer's test record on finished products are defined. This method can be applied for certification purposes. Details of a batch test procedure, which can be used to make an assessment of specific batches, are included, but it is not suitable for certification purposes.

NOTES

- 1** In the process of changing to 230 V nominal supply voltage; a range of ± 3.5 percent shall apply temporarily.
- 2** Nomenclature for bulbs used as envelope for lamps specified in this standard are given in IS 14897.

2 REFERENCES

2.1 The following standards are necessary adjuncts to this standard.

<i>IS No.</i>	<i>Title</i>
14897 : 2000	Glass bulb designation system for lamps — Guide
Doc ET23 (5291)	Safety requirements for tungsten filament incandescent lamps for domestic and similar general lighting purposes (<i>under print</i>)

3 TERMINOLOGY

For the purpose of this standard following definitions shall apply.

3.1 Type — Lamps, which are independent of type of cap are identical in photometric and electrical characteristics.

3.2 Group — Lamps of the same rated wattage, from the same lamp data sheet (normal or high luminous flux), whose rated voltage falls within the same voltage range (for example, 230 V - 250 V).

3.3 Manufacturer — An organization making lamps within the scope of this standard.

3.4 Whole Production — The number of lamps, within the scope of this standard, manufactures in a factory within a 12-month period.

3.5 Batch — All the lamps of one type put forward at one time for test and for checking compliance.

3.6 Light Centre Length — In the sense of this standard and where specified on a lamp data sheet, light centre length is the distance from the geometrical centre of the filament to the contact plate of the cap, including solder.

NOTE — This definition applies regardless of the type of cap used. A light centre length specification applies only to lamps with a clear finish.

3.7 Inspection Test Quantity (ITQ) — The number of lamps to be tested with the intention of determining acceptability, either of the whole production or of the batch, as to dimensional requirements.

3.8 Rating Test Quantity (RTQ) — The number of lamps to be tested with the intention of determining acceptability, either of the whole production or of the batch, as related to initial readings.

3.9 Life Test Quantity (LTQ) — The number of lamps to be tested with the intention of determining acceptability, either of the whole production or of the batch, as related to life.

3.10 Initial Readings — The photometric and electrical measurements made at the end of the ageing period.

3.11 Rated Voltage — Voltage or voltage range specified in the relevant lamp standard or assigned by the manufacturer or responsible vendor.

NOTE — If lamp is marked with a voltage range, it shall be interpreted that they are appropriate for use on any line voltage within that range.

3.12 Test Voltage — The rated voltage unless otherwise specified. If lamps are marked with a voltage range, the test voltage shall be taken as the mean of the voltage range unless otherwise specified.

3.13 Rated Wattage — Wattage specified in the relevant lamp standard or assigned by the manufacturer or responsible vendor.

3.14 Rated Luminous Flux (Unit: Lumen [lm]) — The lumen value declared by the manufacturer.

3.15 Lumen Maintenance — The ratio of luminous flux at 75 percent of rated life to the initial luminous flux, expressed as a percentage.

3.16 Life — The total time for which a lamp has been operated before it becomes useless, or to any other criterion of life performance laid down in this standard.

3.17 Rated Life — The life value specified on a lamp data sheet. Within the context of the life testing method of this standard, it represents the mean value of the truncated life distribution.

NOTE — Since the specified life test method of this standard is a truncated life test, all the lamps that may have been commercially rated relative to the arithmetic mean of full duration life tests must be related. The correction from arithmetic mean life to truncated mean life is based on statistical factors of the normal distribution. Considering the lower limit on individual lamp life of **10.2**, the statistical concepts of Annex L and censoring at 125 percent of the truncated life rating, the truncated life rating is approximately 90 percent of the arithmetic life rating

3.18 Normal Life Test — A life test where in the lamps are operated at their rated voltage.

3.19 Accelerated Life Test — A life test wherein the lamps are intentionally operated at a voltage above the rated voltage with results converted to equivalent life at rated voltage.

3.20 Truncated Life Test — A censored life test wherein the test is terminated at a fixed point, 125 percent of rated life.

3.21 Standard Lamps — A constant light source calibrated directly or indirectly by comparison with a primary standard. This order of standard is also designated as a reference standard (*see* Annex H).

4 LAMP CHARACTERISTICS AND SPECIFICATIONS

4.1 Lamp characteristics and specific performance limits are listed on the individual lamp data sheets. These data sheets are given in Annex G.

4.2 Each lamp data sheet defines a particular lamp "group" by listing the characteristics and limiting values that apply. The technical specifications on each sheet are: dimensions, minimum rated luminous flux, lumen maintenance, rated life, and information for luminaries design.

4.3 The sequence of the data sheets in Annex G is by wattage within the following sub-divisions:

Category	Datasheet Numbers
Lamps with B22 caps, rated life 1 000 h	4000-4999
Lamps with E27 caps, rated life 1 000 h	5000-5999

4.4 Numbering System for Lamp Data Sheets

A lamp data sheet number is made up of four parts as follows:

- the first number represents the number of this standard (IS 4 18);
- the second part is the letter grouping "IS" (Indian Standard);
- the third part is the basic data sheet number from the series in **4.3**;
- the fourth part is a number indicating the edition of the sheet.

NOTE — When amendments are made to data sheets, the affected pages will be issued with an updated edition number for example, if data sheet 418-IS-4005-1 were amended, the new issue would be numbered 418-IS-4005-2.

5 GENERAL REQUIREMENTS

5.1 The lamps on which compliance with this standard is claimed shall comply with the requirements of Doc ET 23 (5291).

5.2 Lamps shall be so designed that their performance is reliable in normal and accepted use. In general, this can be achieved by satisfying the requirements of **6** to **10**.

5.3 Lamps shall be tested under the procedures of Annex A on test procedure.

6 MARKING

6.1 The lamp shall be marked as given in **4.2** of Doc: ET 23 (5291).

6.2 Information identifying the finish and lumen output shall be either marked on the lamp or on the packaging.

NOTE — The manufacturer may declare a higher value operated lumen output than the minimum specified in the standard.

6.3 The lamps may also be marked with BIS Standard Mark.

6.3.1 The use of Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the license for use of the Standard Mark may be granted to the manufacturers or the producers, may be obtained from the Bureau of Indian Standards.

7 LAMP DIMENSIONS

7.1 Lamps shall comply with the dimensional requirements specified on the appropriate lamp data sheet.

7.2 Lamp with E27 caps shall comply with the gauge for testing contact making as given in data sheet 7006-50.

8 CHARACTERISTICS AND TOLERANCES OF INITIAL READINGS

8.1 Wattage

The initial wattage of individual lamps shall not exceed 104 percent of the rated wattage specified on the relevant lamp data sheet plus 0.5 W.

8.2 Luminous Flux Initial

8.2.1 Rated luminous flux of the lamps shall not be less than the values shown on the relevant lamp data sheet.

8.2.2 The initial luminous flux readings of individual frosted, frosted equivalently coated or clear lamps shall not be less than 93 percent of the rated luminous flux.

9 LUMEN MAINTENANCE

9.1 The lumen maintenance of individual lamps at 75 percent of rated life shall be not less than the minimum value specified on the relevant lamp data sheet.

NOTE — For the compliance conditions of **11.1.2.6** and **11.2.3** lamps that do not satisfy these requirements are treated as life failures

10 LIFE TEST REQUIREMENTS

10.1 The truncated average life of a normal life test or the equivalent truncated average life of an accelerated life test, calculated by the method of **B.1.1** of Annex B, shall be equal to or greater than the limits in **B.1.2**, as related to rated life and the LTQ.

10.2 Individual lamps shall have a life of not less than 70 percent of rated life.

11 CONDITIONS OF COMPLIANCE

11.1 Whole Production of a Manufacturer

Compliance is proven by satisfying the require-

ments of **5** to **10** (general, dimensional, electrical, photometric, and life requirements) assessed on the following basis.

11.1.1 Pre-Compliance Testing for Certification Purposes (Applicable for Manufacturers)

NOTE — For certification purposes a recommended pre-compliance test is given in Annex C. Such a test provides temporary recognition of a supplier as explained in C-1.

11.1.2 Compliance of Manufacturer's Test Data

11.1.2.1 The assessment shall be based on the test data in the manufacturer's records grouped together, meeting the requirements of **11.1.2.3**.

11.1.2.2 For certification purposes, the manufacturer shall declare a list of lamp types which are to be within the scope of this standard, and this shall be taken to include all lamps so listed made by the manufacturer. Notifications of additions or deletions may be made at any time.

11.1.2.3 The whole production of a manufacturer shall be considered as satisfying the requirements of this standard if the conditions of **11.1.2.4**, **11.1.2.5** and **11.1.2.6** are fulfilled for at least 75 percent (rounded to the nearest whole number) of the total number of types, as selected in **12.2.2** for which test data has been submitted.

11.1.2.4 Dimensions

A type from the whole production of a manufacturer shall be considered to comply if, for that type, the number of lamps in the manufacturer's records failing the dimensional requirements of **7** does not exceed the qualifying limit shown in Table D-1, Annex D. (This number of lamps is established from data supplied by the manufacturer).

11.1.2.5 Initial readings

A type from the whole production of a manufacturer shall be considered to comply with the initial requirements, if for that type

- a) the number of lamps in the manufacturer's records whose wattage is above the limitation of **8.1** does not exceed the value given in Table D-2, Annex D;
- b) the number of lamps in the manufacturer's records having luminous flux values below the limitation of **8.2.2**, does not exceed the value given in Table D-2, Annex D.

11.1.2.6 Life and lumen maintenance

A type from the whole production of a manufacturer shall be considered to comply if for that type:

- a) the manufacturer's records show that the

truncated average life results satisfy the requirements of **10.1**; and

- b) the total number of individual lamps failing the requirements of **10.2** together with those failing in **9.1** does not exceed the number given in Table D-3, Annex D.

11.1.2.7 A manufacturer who has met, but no longer meets, the specified acceptance levels for **11.1.2.4**, **11.1.2.5** and **11.1.2.6** shall not be disqualified from claiming compliance with this standard providing he can show that either:

- a) action was taken to remedy the situation as soon as the trend was reasonably confirmed from his data and the specified acceptance level was re-established within a period of six months. When corrective action has been taken, compliance is assessed excluding the test records for the period of non-compliance from the 12-month summation. Such data shall form part of the record;
- b) or the type which does not meet the specified acceptance level is deleted from the list of lamp types which he may claim are in conformity with this standard.

11.1.2.8 In the case of a lamp type, which has been deleted under **11.1.2.7** from the list (see **11.1.2.2**), it may be reinstated if satisfactory results are obtained from tests on a number of lamps equivalent to the minimum 12-month period sample in the clause for which failure occurred. The sample may be collected over a short period.

11.2 Compliance of Individual Batches

Sampling for batch shall be made in accordance with **12.3**. A batch shall be considered as satisfying the requirements of this standard, if the conditions contained in **11.2.1**, **11.2.2** and **11.2.3** are fulfilled. If the batch fails to satisfy any of these requirements, it shall be deemed as not complying with the standard.

11.2.1 Dimensions

A batch shall be considered to comply to the dimensional requirements if the number of lamps failing 7 does not exceed four.

11.2.2 Initial Readings

A batch shall be considered to comply to initial requirements if:

- a) the number of lamps whose wattage is above the maximum value specified in **8.1** does not exceed 12;
- b) the number of lamps whose lumen are below the minimum values specified in **8.2.2** does

not exceed 12.

11.2.3 Life and Lumen Maintenance

A batch shall be considered to comply to life requirements if:

- 1) the truncated average life of the LTQ satisfies **10.1**;
- 2) the total number of individual lamps failing the requirement of **10.2** together with those failing the requirements given in **9** does not exceed eight.

11.2.4 Summary of Compliance Conditions for Individual Batches

A summary of the above conditions is given in the following table.

Characteristics	Sample Size <i>n</i>	Qualifying Limit <i>c</i>
ITQ Dimensional requirements	50	4
RTQ Wattage	100	12
RTQ Luminous flux	100	12
LTQ Average life	50	98 percent of rated life
LTQ Life < 70 percent of rated life plus lumen maintenance < minimum value on data sheet	50	8

12 SAMPLING

12.1 Principles of Sampling

The lamps for testing shall be selected so as to ensure proper representation.

NOTE — It should first be ascertained that the values of the rated luminous flux comply with the requirements of the relevant lamp data sheet.

It is not necessary to replace an accidentally broken lamp if the result of the test (approval or rejection) is not affected by its replacement, provided the required quantity of lamps for any subsequent test is available. If replaced, a broken lamp shall be neglected in calculating the test results.

NOTE — Accidentally broken lamps include, for example, lamps damaged during handling and transportation and also lamps becoming defective for reasons, which are not connected with the purpose of a particular test being applied.

For batch and comparability testing, some lamps

additional to the test quantity shall be selected. These lamps shall only be substituted for lamps of the test quantity, if necessary to make up the required number of lamps for the test.

12.2 Sampling for Whole Production Testing (Applicable for Manufacturers)

12.2.1 Pre-compliance Testing for Certification Purposes

Sampling for the pre-compliance test is given in C-2.

12.2.2 Manufacturer's Test Data

The manufacturer shall make available all the data of his finished product tests so far as these relate to the lamp types on the manufacturer's nominated list and are pertinent to the requirements of this standard.

These data shall refer to a sufficient number of lamps, selected over a 12-month period, so as to be representative of the whole production. To meet this requirement there shall be provided:

Manufacturers' test data on:

- for the four largest groups (or all groups if there are less than four), at least 200, 300 and 200 lamps for, respectively, ITQ, RTQ and LTQ with a minimum of 40, 60 and 40 lamps per group for, respectively, ITQ, RTQ and LTQ. If the LTQ of 200 represents more than 0.01 percent of the production, then only 0.01 percent or 40 lamps, whichever is the greater, need be tested;
- for each of the other groups, which together with the four largest groups make up at least 75 percent of the production, a minimum of 20, 30 and 20 lamps for, respectively, ITQ, RTQ and LTQ;
- where a number of types make up a group, test quantities shall be selected from each of those types which make up at least 50 percent of the production for that group;
- for each type for which data has to be presented to meet the above requirements a minimum of 20, 30 and 20 lamps for, respectively, ITQ, RTQ and LTQ;

Providing the above requirements have been met, any types in the manufacturer's records for which there are less than the quantities for ITQ, RTQ and LTQ of 20, 30 and 20, respectively, shall not be considered.

All tests need not necessarily be carried out on the same lamps. The RTQ may contain other individuals than the ITQ, but the LTQ shall be carried out on individuals selected at random from lamps, which have

passed the rating test.

NOTE – This is because the life test results are dependent on the rating test results, this not being the case for inspection test results.

As it may be difficult at the time of sampling to forecast the 12-month production of a type, as a fraction of the whole, percentage values in this section are to be regarded as guidelines, and some flexibility is permitted, provided that the manufacturer's selection of test samples is designed to give proper representation and the minimum test quantities are met.

Where a major change in types made by a factory creates a situation where the minimum test quantities are not met in the 12-month period, it shall be sufficient to show that the rate of testing at the time was compatible with the requirements of this clause.

12.3 Sampling for Batch Testing

12.3.1 There shall be selected a random sample for an ITQ consisting of 50 lamps.

12.3.2 There shall be selected at random an RTQ comprising 100 lamps. The ITQ can be used as part of the RTQ.

12.3.3 From lamps, which have passed the rating test, there shall be selected at random an LTQ of 50 lamps.

13 PRINCIPLES OF DIMENSIONING

13.1 Principles of Dimensioning Incandescent Lamps with Bulb Shape A, K, M or PS and Cap B22d

13.1.1 All dimensions specified on the lamp data sheets are in millimetres (mm).

13.1.2 Figure 1 presents graphical definitions of the dimensional codes for B22d capped lamps.

13.1.3 In the bulb designations of the lamp data sheets, the numerals shown indicate the nominal bulb diameter and are not to be used for assessing the dimensions of the lamps.

13.2 Principles of Dimensioning Incandescent Lamps with Bulb Shape A, K, M or PS, and Edison Screw Cap

13.2.1 All dimensions specified on the lamp data sheets are in millimetres (mm).

13.2.2 Figure 2 presents graphical definitions of the dimensional codes for Edison screw capped lamps.

13.2.3 In the bulb designations of the lamp data sheets, the numerals shown indicate the nominal bulb diameter and are not to be used for assessing the dimensions of the lamps.

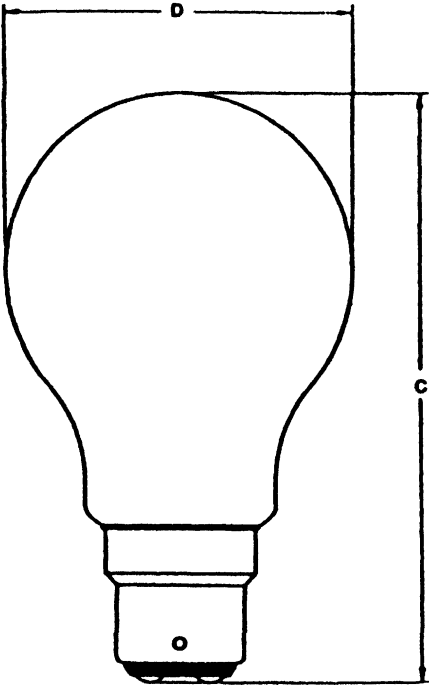


FIG. 1 LAMP WITH B22d CAP

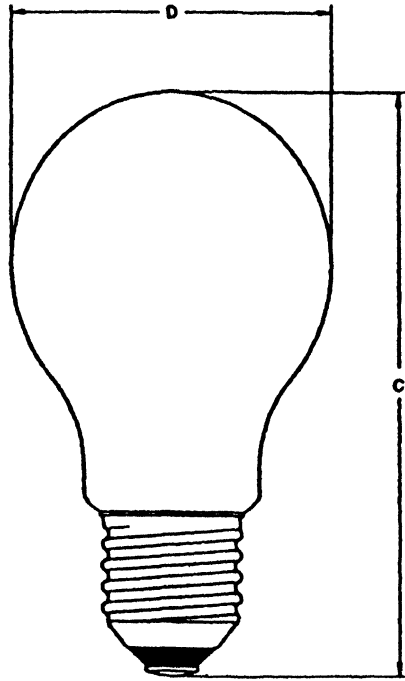


FIG. 2 LAMP WITH EDISON SCREW CAP

ANNEX A (Clause 5.3)

TEST PROCEDURE

A-1 TEST VOLTAGE FOR MEASUREMENTS

Measurements at the required intervals shall be made at the rated voltage of the lamps under test. Lamps marked with a voltage range shall be measured at a test voltage that is half-way between the range limits.

A-2 AGEING PROCEDURE

Before the initial readings are taken, lamps shall be aged at a voltage between rated voltage and 110 percent of rated voltage for a period equivalent to 0.04 percent to 0.1 percent of rated life.

A-3 PHOTOMETRY PROCEDURE

Measurement shall be carried out while utilizing a suitable integrating photometer. This applies both for initial readings and lumen maintenance readings. When taking photometric measurements the test voltage shall be adjusted to be within ± 0.2 percent of the rated voltage of the lamp.

A-4 TEST PROCEDURE FOR LUMEN MAINTENANCE AND LIFE

A-4.1 Operating Position

Lamps shall be operated in a vertical position, cap up. The lampholder's axis on a test rack shall not deviate from the vertical by more than 5° .

A-4.2 Mechanical Stability

Lamps shall operate free from noticeable vibration. No vibration or shock shall be perceptible when touching the lampholders, either during operation or during switching on or off.

A-4.3 Lampholders

A-4.3.1 Lampholders on the life test racks shall be of sturdy construction and shall be designed to ensure adequate electrical contact and to avoid overheating.

A-4.3.2 The voltage drop between the point of voltage measurement and the cap contacts shall not exceed 0.1 percent of the test voltage.

A-4.3.3 Bayonet lampholders shall have an earthed metal barrel.

A-4.3.4 Lamp holders shall be so designed that the torque necessary to insert or extract a lamp shall not exceed the values specified in Doc: ET 23 (5291) for the relevant lamp cap.

A-4.4 Operating Temperature

A-4.4.1 The lamp's cap temperature during operation

shall not exceed the maximum cap operating temperature as specified in Table K- 1 of Doc: ET 23 (5291).

A-4.4.2 Lamps shall not be operated at excessive ambient temperature; neither shall there be undue heating of a lamp by other lamps.

A-4.5 Life Test Voltage

A life test shall be made at rated voltage of the lamps or at a higher value. The test voltage shall be a stable voltage as per **A-4.7** between 100 percent and approximately 110 percent of the rated voltage. For certification purposes, the value of the life test voltage is to be selected by mutual agreement.

NOTE – In general, testing at voltages in excess of the rated voltage is practiced for reasons of economy.

A-4.6 Equivalent Life for Rated Voltage

The equivalent life for rated voltage of an accelerated life test shall be determined in accordance with the following equation:

$$L_o \cdot L \left(\frac{U}{U_o} \right)^n$$

where

L_o = life at rated voltage,

L = life at test voltage,

U_o = rated voltage,

U = test voltage, and

n = 13 for vacuum lamps and 14 for gas-filled lamps.

A-4.7 Supply and Voltage Control

Lamps shall be operated on alternating current at a frequency of a nominal value of 50 Hz.

Voltage variations of the test racks shall not exceed 1 percent of the test voltage.

NOTES

1 It is normally necessary to provide voltage stabilization equipment, and where one stabilizer serves several groups of lamps, fine voltage control for each group is usually necessary to compensate for small voltage variations due to changes in load. Voltage checks and the re-setting of the voltage as near as possible to the test voltage are desirable on a daily basis but the interval should not exceed 100 h at the rated voltage.

2 The response of voltage stabilizers to changes in supply voltage should be such that changes greater than 1 percent are corrected within 1 min.

3 For the case of high-voltage short-duration surges, see Annex F

4 Mains resistance and inductance values relate to the resistance and inductance values when looking back from the lamp position into the mains. When these parameters are measured, voltage stabilizers and devices for providing voltage adjustment should be in circuit at approximately their normal setting. If small resistors or inductors have to be added to achieve the specified values, these should be in place

A-4.8 Test Cycle

Lamps shall be switched off twice daily for periods of not less than 15 mm. Such off periods are not to be considered as part of the operating hours of the lamp.

A-4.9 Test Rack Circuit Characteristics

The test rack circuit is to have the characteristics given in Annex F

A-4.10 Intermediate Measurements

Lamps subjected to the life test shall be measured for luminous flux at the rated voltage at 75 ± 2.5 percent of rated life or its equivalent if accelerated testing is used

A-4.11 Termination of Test

The life test shall be considered to have terminated at 125 percent of rated life, or its equivalent if accelerated testing is used

ANNEX B

(Clause 10.1)

LIFE CALCULATION AND LIMITS

B-1 TRUNCATED AVERAGE LIFE

B-1.1 The truncated average life or equivalent truncated average life is obtained by the summation of the lives of individual lamps divided by the number of lamps. Those lamps still operating at the termination of the test as per **A-4.11** (125 percent of rated life) are treated as having lives of 125 percent of rated life

B-1.2 The minimum limit of truncated average life is given in the following table

LTQ	<i>Minimum, Truncated Average or Equivalent Truncated Average Life in Percent of Rated Life</i>
20 to 24 inclusive	96 percent
25 to 249 inclusive	98 percent
250 and above	100 percent

ANNEX C

(Clauses 11.1.1 and 12.2.1)

RECOMMENDED PRE-COMPLIANCE TESTS FOR CERTIFICATION PURPOSES (APPLICABLE FOR MANUFACTURERS)

C-1 SCOPE

This Annex recommends a pre-compliance testing scheme for certification purposes to establish confidence between the testing authority and the manufacturer before relying on reference to the manufacturer's own test data for whole production testing

C-2 SAMPLING

C-2.1 Sampling shall be representative of a 12-month period of manufacturer

C-2.2 The type with the larger production percentage shall be tested

C-2.3 For this type the lamps for testing shall be selected so as to be distributed as evenly as possible throughout a period of 12 consecutive months.

C-2.4 Lamps shall be selected at the same time, one lot for measurement by the manufacturer and the other lot for measurement by the testing authority

C-2.5 For the selected type quantity of 60 lamps shall be taken for, respectively, the ITQ, RTQ and LTQ

C-3 CONDITIONS OF COMPLIANCE

The pre-compliance selected type shall be considered as satisfying the requirements of this standard, if the requirements contained in **C-3.1** to **C-3.3** are fulfilled. If the pre-compliance selected type fails to satisfy the requirements of any of these clauses, it shall be deemed as not complying with the standard.

C-3.1 Dimensions

The pre-compliance selected type shall be considered to comply if the number of lamps failing 7 does not exceed five.

C-3.2 Initial Readings

The pre-compliance selected type shall be considered to comply if:

- a) the number of lamps whose wattage is above the maximum value specified in **8.1** does not

exceed eight;

- b) the number of lamps whose lumen values are below the minimum values specified in **8.2.2** does not exceed eight.

C-3.3 Life and Lumen Maintenance

The pre-compliance selected type shall be considered to comply if:

- a) the truncated average life of the LTQ attains the value set in **B-1.2**;
- b) the total number of individual lamps failing the requirements of **10.2** together with those failing in **9** does not exceed nine.

C-3.4 Summary of Conditions for Pre-compliance Selected Type

A summary of the above conditions is given in Table C-1.

Table C-1 Conditions of Pre-compliance
(Clause C-3.4)

	Characteristics	Sample Size <i>n</i>	Qualifying Limit <i>c</i>
ITQ	Dimensional requirements	60	5
RTQ	Wattage	60	8
	Luminous flux		8
LTQ	Average lite	60	98 percent of rated life
	Life < 70 percent of rated life plus lumen maintenance < minimum value on data sheet	60	9

ANNEX D(*Clauses 11 1 2 4, 11 1 2 5 and 11 1 2 6*)**STATISTICAL COMPLIANCE TABLES****Table D-1 Dimensional Requirements**

Number of Lamps in Records	Qualifying Limit
20-34	2
35-54	3
55-74	4
75-95	5
96-116	6
117-138	7
119-161	8
162-184	9
185-208	10
209-231	11
232-257	12
258-281	13
282-307	14
308-332	15
333-357	16
358-383	17
384-409	18
410-436	19
437-461	20
462-488	21
489-515	22
516-542	23
541-569	24
570-596	25
597-623	26
624-650	27
651-677	28
678-706	29
707-733	30
734-761	31
762-789	32
790-817	33
818-845	34
846-873	35
874-901	36
902-929	37
930-958	38
959-987	19
988-1016	40
1017 and above	See formula in Annex E

NOTE — The statistical basis for this table is described in Annex E

Table D-2 Initial Readings

Number of Lamps in Records	Qualifying Limit	Number of Lamps in Records	Qualifying Limit
30-34	4	511-523	47
35-41	5	524-535	48
42-50	6	536-547	49
51-60	7	548-560	50
61-70	8	561-573	51
71-80	9	574-586	52
81-90	10	587-599	53
91-101	11	600-611	54
102-111	12	612-624	55
112-122	13	625-637	56
123-133	14	638-649	57
134-144	15	650-661	58
145-154	16	662-674	59
155-165	17	675-687	60
166-177	18	688-699	61
178-188	19	700-712	62
189-200	20	713-725	63
201-211	21	726-737	64
212-223	22	738-749	65
224-234	23	750-762	66
235-246	24	763-775	67
247-258	25	776-787	68
259-270	26	788-799	69
271-282	27	800-811	70
283-293	28	812-824	71
294-305	29	825-837	72
306-317	30	838-849	73
318-329	31	850-862	74
330-340	32	863-874	75
341-353	33	875-887	76
354-365	34	888-899	77
366-376	35	900-912	78
377-389	36	913-924	79
390-401	37	925-938	80
402-412	38	939-951	81
414-425	39	952-964	82
426-437	40	965-977	83
438-449	41	978-990	84
450-461	42	991-1003	85
462-473	43	1004 and above	See formula in Annex E
474-486	44		
87-498	45		
499-510	46		



NOTE — The statistical basis for this table is described in Annex E.

Table D-3 Life Test

Number of Lamps in Records	Qualifying Limit	Number of Lamps in Records	Qualifying Limit	Number of 1 amps in Records	Qualifying Limit
20-28	4	342-352	37	701-711	70
29-36	5	353-363	38	712-722	71
37-44	5	364-373	39	723-733	72
45-53	6	374-384	40	734-744	73
54-61	7	385-394	41	745-755	74
62-70	8	395-405	42	756-767	75
71-79	10	406-415	43	768-778	76
80-89	11	416-426	44	779-789	77
90-98	12	427-437	45	790-800	78
99-107	13	438-447	46	801-811	79
108-117	14	448-458	47	812-822	80
118-127	15	459-469	48	823-831	81
128-117	16	470-480	49	834-844	82
138-146	17	481-491	50	845-855	83
147-156	18	492-502	51	856-867	84
157-165	19	503-513	52	868-878	85
166-175	20	514-523	53	879-889	86
176-185	21	524-535	54	890-901	87
186-195	22	536-547	55	902-912	88
196-205	23	548-557	56	913-924	89
206-216	24	558-567	57	925-935	90
217-226	25	568-578	58	936-917	91
227-236	26	579-589	59	948-958	92
237-247	27	590-601	60	959-969	93
248-257	28	602-612	61	970-980	94
258-268	29	613-623	62	981-991	95
269-278	30	624-633	63	992-1000	96
279-288	31	634-644	64	1003 and abuse	See formula in Annex E
289-299	32	645-655	65		
300-310	33	656-667	66		
311-320	34	668-678	67		
321-331	35	679-689	68		
332-341	36	690-700	69		

NOTE — The statistical basis for this table is described in Annex E

ANNEX E

(Tables D-1, D-2 and D-3)

STATISTICAL CONCEPTS AND BASIS OF THIS STANDARD

Of the various dimensional and performance characteristics covered by this standard, some may be conveniently checked by gauges on a Go, Not Go basis and some are ascribed a specific numerical value. To provide a uniform approach, the former and latter are classified as non-conformities if either they fail the gauges or they fall below (or above) a specific value. All the results may then be treated on an attribute basis and compliance of each tested parameter assessed by reference to qualifying limits in the various tables.

In selecting the AQL levels and the specified limit for the various parameters, it is possible to call for low AQL's associated with a particular specified limit, or to operate with a higher AQL, and with a specified limit nearer the mean value. If the parameter being assessed forms a distribution which approximates to a Gaussian (or normal) distribution then it is more efficient in quality control procedures to operate in the mode with a tighter limit, but a reasonably high AQL.

Such an approach has been adopted in this standard for many years. One of the reasons for this is that some of the tests are either lengthy or destructive making statistical sampling procedures essential. Thus, if a 'non-conformity' is recorded against a particular lamp, it may still be a sound lamp and the probability of it being unsuitable for use is low.

The qualifying limits are such that there is a 0.975 probability of compliance with each condition provided

that the bulk from which the sample (or samples) is drawn contains approximately:

- a) 3 percent failing any single dimensional requirement;
- b) 7 percent outside either of the requirements for initial rating;
- c) 8 percent failing the individual life requirements.

NOTE - Because 0.975 probability of compliance applies to each condition separately, it follows that, at the specified level of quality, the overall probability of compliance would be somewhat lower (by how much it is not possible to estimate accurately)

For larger samplings of test data than those given in the relevant tables in Annex D, the qualify limit for acceptance shall be obtained from the following formula:

$$QL = \frac{AN}{100} + 1.96 \sqrt{\frac{AN}{100}}$$

where

A = appropriate percentage,

N = number of lamps in records, and

QL = qualifying limit for acceptance.

If a fraction results, it shall be rounded to the nearest whole number.

ANNEX F(*Clauses A-4.7 and A-4.9*)**TEST RACK CIRCUIT CHARACTERISTICS**

For 110 V to 250 V lamps, the test rack circuit has the following characteristics

		110 V	210 V to 250 V
Resistance		¹⁾	0.5 ± 0.1
Inductance	μH	¹⁾	$500 \pm 100^{2) 3)}$
Individual external lamp fuse	A	¹⁾	10 slow-acting
Surge limit	B	$600^{1)}$	$600^{1)}$
¹⁾ Under consideration ²⁾ Manufacturer undertaking their own testing may use higher levels of inductance provided the total impedance does not exceed 0.7 ³⁾ The maximum lamp current loading that may be switched on simultaneously is 16 A for 230 V to 250 V test racks ⁴⁾ This information is given to enable surge-limiting means, of the correct rating, to be selected. A 600 V average value is chosen to take into account practical tolerances on such surge-limiting means to ensure that incidental peaks greater than 900 V are suppressed			

ANNEX G(*Clauses 1.1, 4.1 and 4.3*)**GROUPING OF LAMP DATA SHEETS**

Sheet No.	Watts	Bulb	Cap	Finish ¹⁾	Life, h	Luminous Flux ²⁾
418-IS-4005	15	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	N
418-IS-4010	25	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	H
418-IS-4015	25	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	N
418-IS-4030	40	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	H
418-IS-4035	40	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	N
418-IS-4050	60	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	H
418-IS-4055	60	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	N
418-IS-4070	100	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	H
418-IS-4075	100	A60, K60, M60 and PS60	B22d/25×26	C, F	1 000	N
418-IS-4090	150	A68, K68, M68 and PS68	B22d/25×26	C, F	1 000	H
418-IS-4095	150	A80, K80, M80 and PS80	B22d/25×26	C, F	1 000	N
418-IS-4110	200	A80, K80, M80 and PS80	B22d/25×26	C, F	1 000	H
418-IS-4115	200	A80, K80, M80 and PS80	B22d/25×26	C, F	1 000	N
418-IS-5005	15	A60, K60, M60 and PS60	E 27/27	C, F	1 000	N
418-IS-5010	25	A60, K60, M60 and PS60	E: 27/27	C,F	1 000	H
418-IS-5015	25	A60, K60, M60 and PS60	E 27/27	C, F	1 000	N
418-IS-5030	40	A60, K60, M60 and PS60	F 27/27	C, F	1 000	H
418-IS-5035	40	A60, K60, M60 and PS60	E 27/27	C, F	1 000	N
418-IS-5050	60	A60, K60, M60 and PS60	E 27/27	C, F	1 000	H
418-IS-5055	60	A60, K60, M60 and PS60	E 27/27	C, F	1 000	N
418-IS-5070	100	A60, K60, M60 and PS60	E 27/27	C, F	1 000	H
418-IS-5075	100	A60, K60, M60 and PS60	E 27/27	C, F	1 000	N
418-IS-5090	150	A68, K68, M68 and PS68	E 27/27	C, F	1 000	H
418-IS-5095	150	A80, K80, M80 and PS80	E 27/27	C, F	1 000	N
418-IS-5110	200	A80, K80, M80 and PS80	E 27/27	C, F	1 000	H
418-IS-5115	200	A80, K80, M80 and PS80	E 27/27	C, F	1 000	N

¹⁾C = Clear, F = Frosted.²⁾N = Normal luminous flux; H = High luminous flux.

ANNEX H

(Clause 3 21)

REFERENCE LAMPS**H-1 MARKING**

are as follows

H-1.1 The reference lamps shall be provided with durable and legible marking as follows

- a) Identification of the calibrated agency,
- b) Rated lamp wattage,
- c) Rated lamp voltage, and
- d) Lumen at rated current

NOTE — Information regarding (d) may be given in the calibration certificate

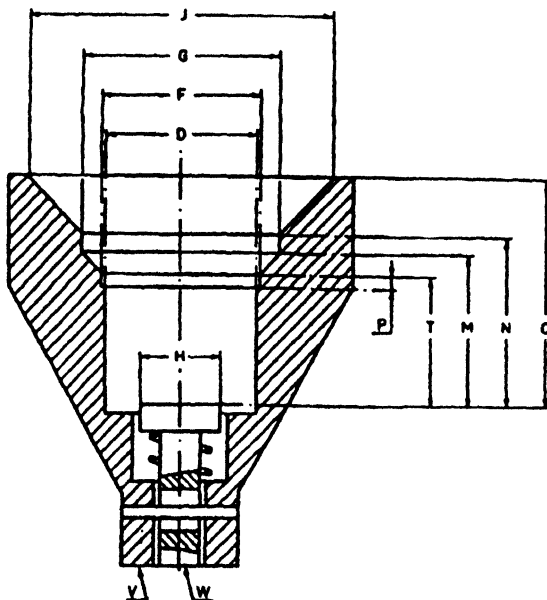
- a) A dc power supply sources shall be used for operating the reference lamps unless otherwise specified in the calibration certificate
- b) The calibrated lamp shall be used at the electrical parameters specified by calibrated agency in the calibration certificate
- c) Ammeter, voltmeter and wattmeter having an accuracy of class 0.1 or better shall be used during measurement
- d) Maximum acceptable tolerance in current and voltage shall be 0.1 percent

H-2 CHARACTERISTICS OF REFERENCE LAMPS**H-2.1** The general guidelines for the reference lamps

**GAUGE FOR FINISHED LAMPS FITTED WITH E 27 CAPS FOR TESTING
CONTACT MAKING E 27**

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauge.



The gauge is shown in the test position.

In the rest position the plunger shall be above plane V.

Purpose: To check lamp dimension for contact

making in lampholders.

Testing: The shape of the lamp with regard to the fit in the lampholder is assumed to be correct, if the lamp can be pushed into the gauge till plane W reaches plane V or projects beyond it.

Data Sheet No. 7006-50

**GAUGE FOR CAPS ON FINISHED LAMPS FOR TESTING PROTECTION AGAINST
ACCIDENTAL CONTACT E 27**

Reference	Dimensions	Tolerance
<i>D</i>	26.55	+0.0 -0.02
<i>F</i>	27.1	+0.0 -0.02
<i>G</i>	34	+0.0 -0.02
<i>H</i>	14	+0.1 -0.1
<i>J</i>	53	+0.0 -0.03
<i>M</i>	25	+ 0.02 -0.0
<i>N</i>	28.3	+ 0.02 0.0
<i>O</i>	37.8	+0.02 -0.0
<i>P</i>	2	+0.1 -0.1
<i>T</i>	21.5	+0.02 0.0

Data Sheet No. 7006-50

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
B22 15 W 1 000 h

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: B22d/25×26

Rated wattage (W): 15

Dimensions: as defined in 13

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of 10

Lumen maintenance (%): 72 % (110 V) or
 74 % (230-250 V)

Conditions of 9 apply

Minimum rated luminous flux:

Conditions of 8 apply

V	lm
110	135
230	120
240	115
250	115

Information for luminaire design:

Maximum outline: under consideration

418-IS-4005-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**

B22 25 W 1 000 h

Dimensions in millimetres

Bulb designation: A60, K60, M60 and PS60

Bulb finish, frosted or clear

Cap. B22d/25 × 26

Rated wattage (W) 25

Dimensions as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h). 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 72 % (110 V) or
74 % (230-250 V)

Conditions of **9** apply

Minimum rated luminous flux

Conditions of **8** apply

V	lm
110	265
230	230
240	225
250	225

Information for luminaire design

Maximum outline: under consideration

418-IS-4010-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
B22 25 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W): 25

Dimensions: as defined in 13

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of 10

Lumen maintenance (%) : 72 % (110 V) or
 74 % (230-250 V)

Conditions of 9 apply

Minimum rated luminous flux:

Conditions of 8 apply

V	lm
110	225
230	220
240	215
250	215

Information for luminaire design:

Maximum outline: under consideration

418-IS-4015-1

HIGH LUMINOUS FLUX INCANDESCENT LAMP DATA SHEET **B22 40 W 1 000 h**

Dimensions in millimetres

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W): 40

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux'

Conditions of **8** apply

V	lm
100	500
230	415
240	410
250	410

Information for luminaire design:

Maximum outline: under consideration

418-IS-4030-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
B22 40 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap. B22d/25 × 26

Rated wattage (W): 40

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h). 1 000

For reference in the requirements of **10**

Lumen maintenance (%). 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
100	445
230	345
240	340
250	335

Information for luminaire design:

Maximum outline: under consideration

418-1S-4035-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
B22 60 W 1 000 h

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W): 60

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	840
230	710
240	700
250	695

Information for luminaire design:

Maximum outline: under consideration

418-IS-4050-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
B22 60 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W): 60

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

v	lm
110	770
230	620
240	610
250	600

Information for luminaire design:

Maximum outline: under consideration

418-IS-4055-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
B22 100 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W): 100

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	1580
230	1340
240	1330
250	1320

Information for luminaire design'

Maximum outline: under consideration

418-IS-4070-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
B22 100 W 1 000 h

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W) 100

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
108.5	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	1420
230	1240
240	1230
250	1220

Information for luminaire design:

Maximum outline: under consideration

418-IS-4075-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
B22 150 W 1 000 h

Dimensions in millimetres

Bulb designation A68, K68, M68 and PS68

Bulb finish frosted or clear

Cap B22d/25 × 26

Rated wattage (W) 150

Dimensions as defined in **13**

For reference in the requirements of **7**

<i>C Max</i>	<i>D Max</i>
128.5	70

Rated life (h) 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 85

Conditions of **9** apply

Minimum rated luminous flux

Conditions of **8** apply

V	lm
110	2 440
230	2 160
240	2 140
250	2 120

Information for luminaire design

Maximum outline under consideration

418-IS-4090-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
B22 150 W 1 000 h**

Dimensions in millimetres.

Bulb designation. A80, K80, M80 and PS80

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W): 150

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
165	82

Rated life (h): 1000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	Im
110	2 360
230	2 070
240	2 060
250	2 040

Information for luminaire design:

Maximum outline: under consideration

418-IS-4095-1

HIGH LUMINOUS FLUX INCANDESCENT LAMP DATA SHEET

B22 200 W 1 000 h

Dimensions in millimetres

Bulb designation A80, K80, M80 and PS80

Bulb finish frosted or clear

Cap B22d/25 × 26

Rated wattage (W) 200

Dimensions as defined in 13

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
165	82

Rated life (h) 1 000

For reference in the requirements of 10

Lumen maintenance (%) 85

Conditions of 9 apply

Minimum rated luminous flux

Conditions of 8 apply

V	lm
110	3390
230	3040
240	2990
250	2950

Information for luminaire design

Maximum outline under consideration

418-IS-4110-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
B22 200 W 1 000 h

Dimensions in millimetres.

Bulb designation: A80, K80, M80 and PS80

Bulb finish: frosted or clear

Cap: B22d/25 × 26

Rated wattage (W) 200

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
165	82

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	3 250
230	2 900
240	2 880
250	2 860

Information for luminaire design:

Maximum outline: under consideration

418-IS-4115-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 15 W 1 000 h

Dimensions in millimetres

Bulb designation A60, K60, M60 and PS60

Bulb finish frosted or clear

Cap 127/27

Rated wattage (W) 15

Dimensions as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h) 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 72 % (110 V) or
74 % (230-250 V)

Conditions of **9** apply

Minimum rated luminous flux

Conditions of **8** apply

V	lm
110	135
230	120
240	115
250	115

Information for luminaire design

Maximum outline under consideration

418-IS-5005-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
E27 25 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap-E27/27

Rated wattage (W): 25

Dimensions as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 72 % (110 V) or
 74 % (230-250 V)

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	265
230	230
240	225
250	225

Information for luminaire design:

Maximum outline: under consideration

418-IS-5010-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 25 W 1 000 h

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W): 25

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 72 % (110 V) or
 74 % (230-250 V)

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	225
230	220
240	215
250	215

Information for luminaire design:

Maximum outline: under consideration

418-1S-5015-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
E27 40 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W): 40

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	500
230	415
240	410
250	410

Information for luminaire design:

Maximum outline: under consideration

418-IS-5030-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 40 W 1 000 h

Dimensions in millimetres

Bulb designation A60 K60, M60 and PS60

Bulb finish frosted or clear

Cap T27/27

Rated wattage (W) 40

Dimensions as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h) 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 85

Conditions of **9** apply

Minimum rated luminous flux

Conditions of **8** apply

V	lm
110	445
230	345
240	340
250	335

Information for luminaire design

Maximum outline under consideration

418-IS-5035-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 60 W 1 000 h

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W): 60

Dimensions: as defined in 13

For reference in the requirements of 7

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1 000

For reference in the requirements of 9

Lumen maintenance (%) 85

Conditions of 9 apply

Minimum rated luminous flux:

Conditions of 8 apply

V	lm
110	840
230	710
240	700
250	695

Information for luminaire design:

Maximum outline: under consideration

418-1S-5050-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
E27 60 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W): 60

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1000

For reference in the requirements of **10**

Lumen maintenance (%) 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	770
230	620
240	610
250	600

Information for luminaire design:

Maximum outline: under consideration

418-IS-5055-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
E27 100 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W): 100

Dimensions, as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	1 580
230	1 340
240	1 330
250	1 320

Information for luminaire design:

Maximum outline under consideration

418-IS-5070-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 100 W 1 000 h

Dimensions in millimetres.

Bulb designation: A60, K60, M60 and PS60

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W): 100

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
110	62

Rated life (h): 1000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
100	1 420
230	1 240
240	1 230
250	1 220

Information for luminaire design:

Maximum outline : under consideration

418-IS-5075-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
E27 150 W 1 000 h**

Dimensions in millimetres.

Bulb designation: A68, K68, M68 and PS68

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W): 150

Dimensions: as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
130	70

Rated life (h): 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

V	lm
110	2 440
230	2 160
240	2 140
250	2 120

Information for luminaire design:

Maximum outline: under consideration

418-IS-5090-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**
E27 150 W 1 000 h

Dimensions in millimetres

Bulb designation: A80, K80, M80 and PS80

Bulb finish: frosted or clear

Cap: E27/27

Rated wattage (W) 150

Dimensions, as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
166.5	82

Rated life (h) 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 85

Conditions of **9** apply

Minimum rated luminous flux.

Conditions of **8** apply

V	lm
110	2 360
230	2 070
240	2 060
250	2 040

Information for luminaire design.

Maximum outline under consideration

418-IS-5095-1

**HIGH LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET
E27 200 W 1 000 h**

Dimensions in millimetres.

Bulb designation. A80, K80, M80 and PS80

Bulb finish: frosted or clear

Cap F27/27

Rated wattage (W). 200

Dimensions as defined in **13**

For reference in the requirements of **7**

<i>C, Max</i>	<i>D, Max</i>
166.5	82

Rated life (h). 1 000

For reference in the requirements of **10**

Lumen maintenance (%): 85

Conditions of **9** apply

Minimum rated luminous flux:

Conditions of **8** apply

v	lm
110	3 390
230	3 040
240	2 990
250	2 950

Information for luminaire design:

Maximum outline: under consideration

418-IS-5110-1

**NORMAL LUMINOUS FLUX
INCANDESCENT LAMP DATA SHEET**

E27 200 W 1 000 h

Dimensions in millimetres

Bulb designation A80, K80, M80 and PS80

Bulb finish frosted or clear

Cap T27/27

Rated wattage (W) 200

Dimensions as defined in **13**

For reference in the requirements of **7**

<i>C Max</i>	<i>D Max</i>
166.5	82

Rated life(h) 1 000

For reference in the requirements of **10**

Lumen maintenance (%) 85

Conditions of **9** apply

Minimum rated luminous flux

Conditions of **8** apply

V	lm
110	3 250
230	2 900
240	2 880
250	2 860

Information for luminance design

Maximum outline under consideration

418-IS-5115-1

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Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones 2323 0131, 2323 3375, 2323 9402 *Website:* www.bis.org.in

Regional Offices:

	<i>Telephones</i>
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
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